

BROWDY AND NEIMARK, P.L.L.C.

ATTORNEYS AT LAW

PATENT AND TRADEMARK CAUSES

SUITE 300

419 SEVENTH STREET, N.W.

WASHINGTON, D.C. 20004-2299

TELEPHONE (202)-628-5197

June 8, 1999

TELECOPIER FACSIMILE

(202) 737-3528

(202) 393-1012

E MAIL

BrwdyNmrk@digizen.net

PATENT AGENT

ALLEN C YUN, PH D

ALVIN BROWDY (1917-1998)
SHERIDAN NEIMARK
ROGER L. BROWDY

ANNE M. KORNBAU
NORMAN J. LATKER
NICK BROMER*
(*PA BAR ONLY)

OF COUNSEL
IVER P. COOPER

Hon. Assistant Commissioner for Patents
Box Patent Appln
Washington, D.C. 20231

RE: New Patent Application in U.S.
Applicant(s): Masataka OKUMOTO et al.
Title: HAIR STYLING IRON
Atty's Docket: OKUMOTO=1

Sir:

Attached herewith is the above-identified application for Letters Patent including:

- ☒ Specification (17 pages), claims (2 pages) and abstract (1 page)
- ☒ 11 Sheets Drawings (Figures 1-11)
 - ☒ Formal ☐ Informal
- ☒ Declaration and Power of Attorney (2 pages)
 - ☒ Newly executed ☐ Copy from prior application no.
- ☐ Preliminary Amendment
- ☐ Supplemental Preliminary Amendment
- ☐ Information Disclosure Statement with () references
- ☒ A verified statement to establish small entity status under 37 CFR §1.9 and 37 CFR §1.27 (1 page(s))
- ☒ A check in the amount of \$380.00 (check no. 22475) to cover:
 - ☒ The filing fee calculated as follows:

CLAIMS AS FILED				
FOR	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE \$ 760.00
TOTAL CLAIMS	9 - 20=	0	x 18	0
INDEPENDENT CLAIMS	1 - 3=	0	x 78	0
<input type="checkbox"/> Multiple Dependent Claim Presented			x260	
<input checked="" type="checkbox"/> Reduction of 1/2 for small entity				- \$ 380.00
		TOTAL FILING FEE		\$ 380.00

- ☐ Any additional fee required by the filing of an enclosed preliminary or supplemental preliminary amendment has been calculated as shown below:

1c549 U.S. PTO
09/327382
06/08/99

1c408 U.S. PTO
06/08/99

05327382-060899

	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	CALCULATION
TOTAL	*	MINUS	**	=	x \$ 18.00	\$
INDEP	*	MINUS	***	=	x \$ 78.00	\$
<input type="checkbox"/> Multiple Dependent Claim Presented					x \$260.00	\$
Total of Above Calculations =						\$
Reduction by 1/2 for filing by small entity						- \$
Total Additional Fee =						\$

[] _____.

[X] Return Receipt Postcard (in duplicate)

The following statements are applicable:

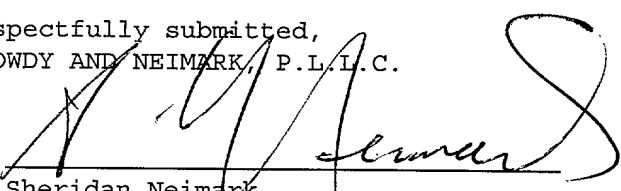
- [X] The benefit under 35 USC §119 is claimed of the filing date of: Japanese Application No. 182800/98 in Japan on June 29, 1998; and Japanese Application No. 036564/99 in Japan on February 15, 1999.
A certified copy of each of said priority documents is attached.
- [] The present application is a [] Continuation [] Divisional
[] Continuation-in-part of prior application No. _____.
- [] Incorporation By Reference. The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied herewith, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- [] A signed statement deleting inventor(s) named in the prior application is attached.
- [] Amend the specification by inserting before the first line the sentence:
--This is a __ continuation __ division of copending parent application Serial No. filed _____.--
- [] Certain documents were previously cited or submitted to the Patent and Trademark Office in the following prior application _____, which is relied upon under 35 USC §120. Applicants identify these documents by attaching hereto a form PTO-1449 listing these documents, and request that they be considered and made of record in accordance with 37 CFR §1.98(d). Per Section 1.98(d), copies of these documents need not be filed in this application.
- [] A verified statement claiming small entity status is enclosed in progenitor application no. _____, filed _____. Status is still proper and desired.
- [] The undersigned attorney of record hereby revokes the powers of attorney of:

In re of OKUMOTO=1

- [] The undersigned attorney of record hereby appoints associate power of attorney, to prosecute this application and to transact all business in the Patent and Trademark Office in connection therewith to:
- [X] The Commissioner is hereby authorized to charge payment of the following additional fees associated with this communication or credit any overpayments to Deposit Account No. 02-4035:
- [X] Any additional filing fees required under 37 CFR §1.16.
- [X] Any patent application processing fees under 37 CFR §1.17.
- [X] The Commissioner is hereby authorized to charge payment of the following fees, based on any paper filed during the pendency of this application or any CPA thereof, to effect any amendment, petition, or other action requested in said paper or credit any overpayments to Deposit Account No. 02-4035:
- [X] Any patent application processing fees under 37 CFR §1.17.
- [] The issue fee set in 37 CFR §1.18 at or before mailing the Notice of Allowance, pursuant to 37 CFR §1.311(b).
- [X] Any filing fees under 37 CFR §1.16 for presentation of extra claims.
- [X] If a paper is untimely filed in this or any CPA thereof by Applicant(s), the Commissioner is hereby petitioned under 37 CFR §1.136(a) for the minimum extension of time required to make said paper timely. In the event a petition for extension of time is made under the provisions of this paragraph, the Commissioner is hereby requested to charge any fee required under 37 CFR §1.17 to Deposit Account 02-4035.
- [X] The Commissioner is hereby authorized to credit any overpayment of fees accompanying this paper to Deposit Account No. 02-4035.

Respectfully submitted,
BROWDY AND NEIMARK, P.L.L.C.

By:


Sheridan Neimark

Registration No. 20,520

SN:bcs

f:\user3\99jun\okul.ntr

Masataka OKUMOTO
Atsuo NIWA
Satoshi OGAWA
Yasufumi TAKEDA
Kazuki FUJII
Katsumi KANEYAMA

Applicant or Patentee: _____ Attorney's Docket No.: _____
Serial or Patent No.: _____ Filed or Issued: _____
For: HAIR STYLING IRON

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL BUSINESS ENTITY STATUS
(37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN

I hereby declare that I am
☒ the owner of the small business concern identified below:
☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN MILBON CO., LTD.
ADDRESS OF CONCERN 17-2, Akagawa 2-chome, Asahi-ku, Osaka-shi, Osaka-fu, 535-005 Japan

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled _____ by inventor(s) _____ described in:

☒ the specification filed herewith
☐ application serial no. _____, filed _____
☐ patent no. _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

*Note: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27).

NAME _____
ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

NAME _____
ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Ichiro KOUNOIKE
~~TITLE OF PERSON SIGNING OTHER THAN OWNER~~ c/o Milbon Co., Ltd, 17-2, Akagawa 2-Chome, Asahi-ku,
ADDRESS OF PERSON SIGNING Osaka-shi, Osaka-fu, 535-0005 Japan

SIGNATURE Ichiro Kounoike DATE May 20, 1999

HAIR STYLING IRON

TECHNICAL BACKGROUND OF THE INVENTION

5 The present invention relates to a hair styling iron, and more specifically to a hair styling iron used for giving a press treatment in which the hair is exposed to heat and pressure.

RELATING PRIOR ART

10 Up to now, for giving straight-perm treatment to the hair, the hair is applied with a first perming solution and then smoothed down with a comb on a plastic plate called a "panel" while stroking the hair with the back of the comb. Alternatively, the hair is smoothed down with a comb only, without the help of a panel. Either of these operations, generally called a "strainer operation", is aimed for providing uniform rearrangement of the cuticle up to
15 the tip of the hair by smoothing down the hair, thereby giving the hair a glossy smooth surface. The use of a panel, however, causes substantial damages to the hair. On the contrary, the operation, when carried out using a comb only, fails to provide uniform rearrangement of the cuticle, thus
20 suffering from uncertain finish.

 An objective of the present invention is to provide a device that allows to carry out strainer or the like operations on the hair which is gentler to the hair than the operation employing the aforementioned panel, and of greater certainty than the operation using a comb only. A further objective of the
25 present invention is to provide a hair styling iron which can be handled with ease even on thick and/or long hair and enables application of sufficient pressures. A still further objective of the present invention is to provide a hair styling iron capable of providing simultaneous heating and pressing treatment and yet causing less sensation of heat even when touching the

heated portion thereof. A still further objective of the present invention is to provide a hair styling iron that allows an easy operation even on a confined region of short hair such as over the nape (back) or around the ears and yet causes less sensation of heat when holding its heated portions with fingers, thereby making it possible to carry out a delicate operation with certainty.

SUMMARY OF THE INVENTION

The hair styling iron of the present invention is characterized in that it comprises (A) a first lever including a grip portion, a plate portion equipped with an electric heater, and a fulcrum portion, and (B) a second lever including another grip portion opposed to the grip portion of the first lever, a plate portion equipped with an electric heater and opposed to the plate portion of the first lever, and a fulcrum portion pivotally supported by the fulcrum portion of the first lever.

In such a type of hair styling iron, a spring is preferably interposed between the first and the second levers to render the plate portions biased in the direction away from each other. Also, it is preferable that the plate portion of the first lever and (or) the second lever has ridges along the perimeter thereof, and it is more preferable that the plate portion of the first lever and (or) the second lever has been subjected to a flocking treatment from the perimeter to the outer surface thereof. Each of the fulcrum portions of the first lever and the second lever may be located between the respective grip and plate portions. In this case, the first lever is preferably provided in two separate parts divided by a median plane along the both sides, which then is assembled and integrally connected after pivotally sandwiching, between the bilateral half bodies of its fulcrum portion, the fulcrum portion of the second lever. It is further more preferable that the present hair styling iron is provided with a pilot lamp which blinks at predetermined intervals while the electric heater thereof is energized.

Furthermore, the fulcrum portions of the first and the second levers may be located at the rear end of the respective grip portions. In this case, it is preferable that a finger resting portion is provided on the outer side of each of the plate portions, with an intervening space for heat insulation being positioned therebetween .

The finger resting portion is preferably made up of a board-like or bar-like element that is continuous at its forward region to the surface of the plate portion, and at its rearward region to the grip portion.

In the hair styling iron of the present invention, the plate portions can be closed toward each other by causing a pivotal motion of the first and the second levers relative to each other around the fulcrum portions by gripping the grip portions of the first and second levers. The temperature of the plate portions can be elevated by energizing the heaters. Therefore, it is possible, by taking a strand of hair in one hand and then sandwiching it between the plate portions of the hair styling iron held in the other hand, to apply to the hair an elevated temperature as well as an evenly distributed pressure. In addition, by gently stroking the hair with the hair styling iron in this situation, a strainer operation can be performed.

Thus, as the hair styling iron of the present invention enables a strainer operation with simultaneous heating, it allows an effective strainer operation even with a perming solution at lower concentrations. Therefore, this is more friendly to the hair than the aforementioned operation where a strong stroke is applied with a comb and a panel. Thus it can avoid giving damages to the hair. Moreover, it provides a more reliable strainer operation than the operation by means of a comb only.

The hair styling iron which is provided with a spring to render the plate portions biased in a direction away from each other, opening and closing of the plate portions can be effected simply by controlling the amount of the gripping force applied on the grip portions. It is thus also easy to control the

pressure levels. In the hair styling iron provided with ridges formed along the perimeter of the plate portion, the temperature of the ridges, as cooled by surrounding air, remains lower than that of the other part of the plate portion even while the temperature of the latter is elevated. Therefore, an
 5 inadvertent contact with the skin would not cause excessive sensation of heat. Further, the hair styling iron which has been subjected to a flocking treatment from the perimeter to the outer surface of its plate portion, due to its lowered thermal conduction, will not cause an excessive sensation of heat when a limited contact with the skin occurs.

10 In the hair styling iron in which each of the fulcrum portions of the first and the second levers is located between the corresponding grip and plate portions, opening and closing of the plate portions is effected in the same manner as in handling pliers, i.e., by gripping the grip portion of the first lever with, for example, the thumb and the index finger and holding the grip
 15 portion of the second lever between, for example, the ring finger and the little finger. This type of hair styling iron is able to generate strong pressures between the plate portions because a sufficiently long distance may be adopted between the grip and the fulcrum portions.

In the hair styling iron in which the first lever is provided in two
 20 separate parts divided by a median plane along the both sides, which parts then is assembled and integrally connected after pivotally sandwiching the fulcrum portion of the second lever between the bilateral halves of its fulcrum portion, it is allowed for the second lever to be securely held by the first lever. In the type which is provided with a pilot lamp which blinks at predetermined
 25 intervals while the electric heaters are energized, it is allowed for the operator to conveniently follow the time lapse in each treatment by simply counting the blinks while performing thermal press treatment on the sandwiched portion of the hair.

With the hair styling iron in which each of the fulcrum portions is

located at the rear end of the corresponding grip portion, it is possible to widely open and close the plate portions by slightly opening and closing the grip portions. In addition, as each of the fulcrum portions is located at the rear end, a compact configuration is possible. In this type of hair styling iron, moreover, when a finger resting portion is provided on the outer side of each of the plate portions, with an intervening space for heat insulation being positioned therebetween, less heat is conducted from the plate portion to the finger resting portion, thereby allowing to firmly close the plate portions using fingers without being disturbed by heat. Also, this configuration enables an easy operation even on a confined region of short hair, such as over the nape or around the ears, for it allows handling with fingers applied in close proximity to the plate portions, i.e. the portions between which a strand of hair is actually sandwiched.

Where the finger resting portion is made up of a board-like or bar-like element that is continuous, at its forward region, to the surface of the plate portion and, at its rearward region to the grip portion, it is allowed to readily mold the finger resting portion, plate portion and grip portion as a unitary part. In addition, as the finger resting portion is supported at its both ends, high flexural rigidity is provided. Furthermore, the wide surface area of the finger resting portion provides efficient cooling.

Embodiments of the hair styling iron of the present invention are described in greater detail below with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates a perspective view of an embodiment of the hair styling iron of the present invention.

Fig. 2 illustrates an exploded perspective view of the embodiment illustrated in Fig. 1 before assembled.

Fig. 3 is an perspective view of the sandwiching member illustrated in

Fig. 2 before assembled.

Fig. 4a illustrates a sectional view taken along the line IV-IV in Fig. 2.

Fig. 4b illustrates a rear view of the sandwiching member viewed in the direction indicated by the arrow head V in Fig. 3.

5 Figs. 5a and 5b illustrate a partially cross-sectional side view and a plan view, respectively, of the hair styling iron.

Fig. 6 illustrates the hair styling iron being used.

Fig. 7 illustrates a perspective view of another embodiment of the hair styling iron of the present invention.

10 Figs. 8a and 8b illustrate a plan view and a side view of the hair styling iron illustrated in Fig. 7.

Fig. 9 illustrates an exploded perspective view of the hair styling iron illustrated in Fig. 7 before assembled.

15 Fig. 10a illustrates a sectional view taken along the line Xa-Xa in Fig. 8b.

Fig. 10b illustrates a sectional view taken along the line IXb-IXb in Fig. 7b.

Fig. 10c illustrates a sectional view taken along the line IXc-IXc in Fig. 7b.

20 Fig. 11a illustrates a sectional view taken along the line XIa-XIa in Fig. 8b.

Fig. 11b illustrates a sectional view taken along the line XIb-XIb in Fig. 8a.

25 DETAILED DESCRIPTION OF THE INVENTION

The hair styling iron A illustrated in Fig. 1 consists of a body 1, which is also referred to as a first lever, and a sandwiching member 2, which is also referred to as a second lever, pivotally connected to the body 1. The body 1 includes a grip portion 4, a fulcrum portion 5 which extends downwardly from

the forward end of the grip portion 4, and a plate portion 6 which extends forwardly from the lower end of the fulcrum portion 5. In this embodiment, the body 1 is molded as a pair of laterally separated half bodies 1a and 1b, as illustrated in Fig. 2. These half bodies then are matched with each other and connected to form the integral body 1. Plate portion 6 of the body 1 is formed with a rectangular recess 7, within which is nested a plate 8 including a plain heater H, with the surface of the plate 8 being exposed. Side walls of the recess 7 are formed with grooves 7a, which are brought into engagement with ridges 8a on both sides of the plate 8, thereby preventing the plate 8 from dislocation. Both the fulcrum portion 5 and the grip portion 4 are of hollow structure, and through the cavity thus defined extends an electric cord (see Fig. 5a, reference numeral 25) for energizing the heater H, via an on-off switch (Fig. 5a, symbol S), and out of the rear end of the grip portion 4.

In addition, rectangular openings 9 and 10 are defined in the front face of the fulcrum portion 5 and in the region from the rear end of the fulcrum portion 5 to the lower portion of the forward end of the grip portion 4, respectively, to pass the sandwiching member 2 through them. On the inner walls of the fulcrum portion 5, a protruding cylindrical bearing portion 11 is formed for providing pivotal support to the sandwiching member 2, as well as a spring receptacle 13 for receiving the upper end of a spring 12 is also defined. The spring 12 serves to pivotally bias the sandwiching member 2 so that, as illustrated in Fig. 5a, the forward end thereof is normally placed in open position. Around the perimeter of the plate portion 6 are formed ridges 14 of a semicircular cross-section. The body 1 may be, for example, a molded article of a heat-resistant plastic. Also, as desired, it may be produced through die casting of metals such as aluminum or zinc.

On the other hand, the sandwiching member 2 includes a lever portion 15, a fulcrum portion 16 which extends forwardly from the upper portion of the forward end of the lever portion 15, and a plate portion 17 which extends

forwardly from the forward end of the fulcrum portion 16. The lever portion 15, when assembled as illustrated in Fig. 1, is located beneath the grip portion 4 of the body 1. In the sandwiching member 2 of this embodiment, plate portion 17 is provided in the form of two bilaterally divided parts. One of the half bodies, 17a, of plate portion 17, is molded integral to the forward end of the fulcrum portion 16. The other half body 17b is matched with and connected to the first half body 17a after nesting the separately prepared heater H and the plate 18. Also with the plate portion 17 of the sandwiching member 2, ridges 14 are formed around its perimeter. The plate portion 17 is formed with a recess 19 for nesting the plate 18, and side walls of the recess 19 are formed with grooves 20 to be brought into engagement with the ridges 18a of the plate 18 (see Fig. 4b).

The fulcrum portion 16 is of a shape such that the rearward part 16b thereof has undergone a downward translational shift relative to the forward part 16a. As illustrated in Fig. 4b, the forward part 16a is of a bracket-like shape, which is brought into engagement with and then connected, e.g. with bolts, to a support piece 16c extending from the rearward portion of the other half body 17b. The rearward part 16b of the fulcrum portion 16 is formed with a horizontal bore 21. The bore 21 is for accommodation of a pivot pin 22 which serves to pivotally connect the sandwiching member 2 to the body 1. A vertical blind bore 23 is also defined to rearward of the bore 21. The bore 23 is aimed for receiving and holding the lower end of the spring 12.

The lever portion 15 of the sandwiching member 2 is angled in its middle, with the rearward part extending obliquely downwardly. This allows secure engagement with the ring finger and the little finger. As is the case of the body 1, also the sandwiching member 2 may be, for example, a molded article of a heat-resistant plastic. As desired, it may also be produced through die casting of metals such as aluminum or zinc.

The plate portions 6 and 17 of the body 1 and the sandwiching member

2, respectively, have been subjected to an electrostatic flocking treatment from the perimeter to the outer surface thereof so as to lessen the sensation of heat when they come into contact with the skin. Flocking treatment may be carried out by embedding nylon pile fibers vertically in the surface layer of the plate portions which has been dissolved with naphtha. In addition, the surface of the plates 8 and 18 has been subjected to a treatment that serves to reduce friction, e.g. Teflon coating, thereby allowing easy slide of the hair therebetween. Teflon coating further improves non-tackiness, heat resistance and erosion resistance.

The body 1 and the sandwiching member 2 thus provided are assembled as follows: First, the sandwiching member 2 is assembled by nesting the heater 18 within the half body 17a of the plate portion 17 of the sandwiching member 2, and then matching and securing therewith the other half body 17b (see Fig. 3). Preferably, one of the half bodies is provided with pin-like projections, which are mated with corresponding bores formed in the other half body, in order to assist positioning and reinforce connection (see Figs. 4a and 4b). As desired, an adhesive may be applied. Then, the pivot pin 22 is inserted in the bore 21 of the fulcrum portion 16 of the sandwiching member 2. The heater 8 is then nested within the plate portion 6 of the half body 1a of the body 1, the spring 12 is inserted into the bore 23, and then the end of the pivot pin 22 are mated with the bearing portions 11 of the fulcrum portion 5 of the body 1. Finally, the other half body 1b of body 1 is integrally connected, with the fulcrum portion 16 passing through the openings 9 and 10. Thus, the hair styling iron as illustrated in Figs. 1, 5a and 5b is obtained.

The reference numeral 24 in Figs. 1 and 5b indicates a pilot lamp or indicator lamp which tells when the heater H is energized. The pilot lamp 24 comprises a light-emitting diode. The pilot lamp 24 operates in either of the two modes, i.e., a mode in which it is kept ON while the heater H is energized and an ON-OFF mode in which it is turned on (or off) at predetermined

intervals, e.g. once in every second, and it can be switched between these modes. Where the latter mode is selected, the operator can readily follow the time lapse while a strand of hair is being press-treated. The reference numeral 25 in Fig. 5a indicates an electric cord, the end of which is connected with a plug, and in the middle of which is provided with a controller including a temperature adjustment dial. A temperature sensor is provided on or in close proximity to the heater H. The system is arranged so that the heater H is kept at a temperature selected with the temperature adjustment dial through the regulation of the current (or voltage) applied to the heater H based on the output from the sensor and by means of the controller including the temperature adjustment dial and a controller circuit. The temperature adjustment dial is, for example, a volume dial that allows to select a desired temperature within the range of 60-180 °C. For a temperature frequently selected, the dial is provided with a detent mechanism which temporarily locks the dial with a snapping sensation so as to prevent the dial from drifting. A blink control circuit for the aforementioned pilot lamp 24 is also included in the controller.

The thus assembled hair styling iron A is used as exemplified in Fig. 6. That is, the hair styling iron A is held with, for example, the thumb and the index finger, with the grip portion 4 of the body 1 facing upward, a strand of hair P sliced with the left hand is placed between the plate portions, and then pressure is applied by pulling the lever with, for example, the ring and the small fingers. In this manner, a press-treatment is performed in which the hair is subjected to a pressure while being simultaneously heated at an appropriate temperature. The time lapse during the press treatment, e.g. a span of several seconds, can readily be followed based on the blinking of the pilot lamp 24. In addition, a strainer operation can be carried out by sliding the plate portions toward the tip of the hair, with the strand of hair B being lightly sandwiched therebetween. For this purpose, a slice of 1-3 cm wide is

proper. While sliding the hair styling iron A, tension is preferably applied to the strand of hair P by lightly pulling it downwardly with the left hand.

With the above hair styling iron A, as heat and pressure can be applied to the hair sandwiched between the plate portions 6 and 17 of the body 1 and the sandwiching member 2, a partially curled area of the hair could be corrected with ease. In addition, as a heater is included in each of the plate portions 6 and 17 of the body 1 and the sandwiching member 2, a simultaneous and uniform heating is effected on both sides of the sandwiched strand of hair P. Furthermore, as the plate portions 6 and 17 of the body 1 and the sandwiching member 2 are biased to open by means of the spring 12, easy control of pressure is available. Still further, each of the plate portions 6 and 17 of the hair styling iron A has been subjected to an electrostatic flocking treatment on its outer surface (i. e. the surface opposite to the side nesting the heater H and the plate 8 or 18) and perimeter, and the ridges 14 are provided on each of the perimeters of the plate portions 6 and 17. Thus, an inadvertent touch on the skin with the outer surface or perimeter of the plate portions 6 or 17 would not cause excessive sensation of heat.

A description is given below to a procedure of carrying out a straight perm operation using the hair styling iron A:

To begin with, a first solution for straight-perming is applied to the hair, and the hair is allowed to stand for a while so as to assure the first solution sufficiently soaking into the hair, thus reducing and softening the hair with the solution. Then after conducting a softening test to confirm that a desired level of softening is reached, the hair is subjected to an intermediate washing with water to wash away the agent adsorbed on the hair. Then, after removing excess water from the hair, the aforementioned strainer treatment is started (2-3 strainer operations for a single slice of hair). A second solution is then applied to the hair, and the hair is allowed to stand, while keeping it extended straight, for effecting oxidation and thereby

restoration of elasticity of the hair with the second solution to complete straight-perming.

In this straight-perming treatment, a strainer operation is performed primarily for evenly rearranging cuticle to the tip of the hair, thereby giving
5 the hair a glossy smooth surface.

While in the above embodiment, the sandwiching member 2 is passed through the openings 9 and 10 formed in the body 1, a configuration is also allowed in which a sandwiching member and a body are simply crossed against each other and connected with a pivot pin, as in the manner known for
10 usual scissors.

A hair styling iron B illustrated in Figs. 7 and 8 includes a first lever 26 and a second lever 27, the latter being pivotally connected at its rear portion with the rear portion of the former. The first lever 26 includes a grip portion 4 located in the middle of its length, a fulcrum portion 5 located in the
15 rear, and a plate portion 6 located in the forward portion. In this embodiment, the second lever 27 is of the same configuration as the first lever. Therefore, the following description is given primarily with regard to the first lever 26. Herein, symbol H indicates a heater, SW in Fig. 8b a switch for on-off of the power supply to the heater H, and reference numeral 24 a pilot
20 lamp for indicating on-off of the heater H.

As illustrated in Fig. 9, also in this embodiment, the body of the first lever 26 is molded as two laterally divided hollow half bodies 26a and 26b of a heat-resistant plastic or the like, which are then matched and connected with each other to form a single integral hollow body as shown with regard to the
25 second lever 27. In this embodiment, the right half body 26a of the first lever 26 and the left half body 27a of the second lever 27 are of the same shape, and so are the left half body 26b of the first lever 26 and the right half body 27b of the second lever 27.

The plate portion 6, as in the hair styling iron A aforementioned, has

flat and generally rectangular configuration, the inner side (the side opposed to the second lever 27) of which is formed with a rectangular recess 7, within which a plate 8 containing a plain heater H is nested, with its outer surface being exposed. The plate 8 is made of a thin metal sheet. As illustrated in Figs. 10a and 10b, side walls of the recess 7 are formed with grooves 7a, which are brought into engagement with the ridges 8a on both sides of the plate 8, thereby preventing the plate 8 from dislocation. A space 30 is defined between the upper face of the heater H and the upper wall 29 of the plate portion 6. Therefore, the heater H and the plate 8 are in contact with the first lever 26 only through their lateral perimeters. This hinders conduction of heat to the first lever 26.

The grip portion 4 is narrower in width than and somewhat elevated compared with the plate portion 6. As Fig. 8b clearly illustrates, a board-like finger resting portion 31 extends from around the forward end of the grip portion 4 toward the middle of the plate portion 6. The upper face of the finger resting portion 31 is flush with the upper face of the grip portion 4, and a transverse through slit 32 is defined between the plate portion 6 and the finger resting portion 31 (see Fig. 10b). The slit 32 continues from around the forward end of the finger resting portion 31 to the middle of the grip portion 4. Thus, finger resting portion 31 is continuous to the plate portion 6 only at its forward end 33. The slit 32 is provided to hinder conduction of heat from the plate portion 6 to the finger resting portion 31. Alternatively, the finger resting portion 31 may be configured such that it is spaced away at its forward end 33 from the plate portion 6, thus forming the former as a cantilever. In addition, the slit 32 may be filled with foamed plastic with high heat insulation. The "space" recited in the attached claims is meant to include such an embodiment. Furthermore, the slit 32 may be laterally closed. In such a case, the space ("slit") within the finger resting portion 31 is provided as an isolate heat insulation space separated with a plate from the

interior of the plate portion 6.

As Fig. 10c illustrates, the grip portion 4 also is of a hollow structure, and its both sides are formed with slanted surfaces 34 in its lower portion, with the width of the grip portion 4 decreasing downwardly. These slanted surfaces 34 provide escapes which help avoid pinching the palm of the hand holding the grip portion 4 while the first lever 26 and the second lever 27 are being closed toward each other. SW shown in phantom lines in Fig. 10c indicates the switch as aforementioned.

As illustrated in Fig. 9, the fulcrum portion 5 of the first lever 26 includes a generally hemicylindrical blind bearing portion 36 provided on the right half body 26a, and a generally hemicylindrical shaft portion 37 provided on the left half body 26b. The bearing portion 36 is given a central angle smaller than 180° (e.g. 173.5°) by half (e.g. 6.5°) of the maximal opening angle (e.g. 13°) between the levers. Since it is enough for the shaft portion 37 to be allowed a pivotal motion within the bearing portion 36 up to a predetermined angle (see Fig. 11b), as can be seen in the right half body 27b of the second lever 27, the shaft portion 37 is composed only of an opposing pair of arc-like elements, with its upper wall being cut out by a predetermined angle. This cutout 37a is utilized to pass through a heater cord Hc and a pilot lamp cord Lc, as illustrated in Fig. 11b. On the base plate of the shaft portion 37 is formed a protruding cylindrical boss 39 in which a spring shaft 38 is to be fit (see Figs. 11a and 11b). The spring shaft 38 is composed of a pair of shaft members 38a and 38b which are concentrically aligned via a gap therebetween and a torsion coil spring 38c which is arranged around the shaft members and secured at its both ends to the shaft members 38a and 38b. On the surface of each of the shaft members 38a and 38b is defined a locking groove 40 extending parallel to the axis, and on the inner surface of each of the bosses 39 is formed a locking ridge 41 for engagement with the locking groove 40 (see Fig. 11b).

The inner wall 42a of the rear portion 42 located to rearward of the fulcrum portion 5 of the first lever 26, i.e. the wall opposed to the second lever, is angled relative to the grip portion 4 by half of the aforementioned maximal opening angle. Therefore, inner walls 42a of the rear portions 42 provide a
 5 stopper. In the rear end wall 42b is defined an opening 23 for an electric cord. The upper wall 42c of the rear portion 42 is angled upwardly toward the rear end. This angle serves as an anti-slip configuration to prevent the hair styling iron held by the operator from slipping off.

As illustrated in Fig. 7, also in this embodiment, the first lever 26 and
 10 the second lever 27 have been subjected to an electrostatic flocking treatment on the plate portions 6, the finger resting portions 31 and the forward part of the grip portions 4.

An example of assembling procedure of the hair styling iron B is described below:

15 First, one of the shaft members 38a of the spring shaft 38 is fit in the boss 39 of the left half body 26b of the first lever 26, with the locking ridge 41 being engaged with the locking groove 40. Then, the right half body 27b of the second lever 27 is pivoted by 180° about the pivot axis S with respect to the left half body 26b of the first lever 26. In this orientation, the other shaft
 20 member 38b of the spring shaft 38 is fit in the boss 39, with the locking ridge 41 being engaged with the locking groove 40. Then, against the biasing force of the torsion coil spring 38c, the right half body 27b of the second lever 27 is pivoted back by 180° for allowing it to meet the half body 26b of the first lever 26. Then, the remaining half bodies 26a and 27a are mated with
 25 corresponding half bodies 26b and 27b, respectively. In this process, positioning is made by placing each bearing portion 36 over the corresponding shaft portion 37. Thus, the first lever 26 and the second lever 27, respectively, are integrally assembled.

The heaters H and the plates 8 are inserted into the plate portion 6 of

one of the half bodies either before the start of the assembling procedure or just prior to the assembling of the half bodies. The cord Hc of the heater H of the first lever 26 has been connected to the output terminals of the switch SW and the cord from the input terminals of the switch SW is directed out of an opening 43 defined in the rear. As illustrated in Fig. 11b, the cord Hc of the heater H of the second lever 27 extends through a gap 44 between the shaft portion 37 and the boss 39 and is then connected to the output terminals of the switch SW placed in the first lever 26. In the opening 43 in the rear of the second lever 27 is fit by the aforementioned indicator lamp 24, the cord Lc of which also extends through the gap 44 between the shaft portion 37 and the boss 39 and is then parallel connected to the output terminals of the switch SW. In the second lever 27, as no switch is contained in it, the opening for switch is closed with a closing member.

The lamp 24 and the method for controlling its on-off is the same as described with regard to the hair styling iron A.

In the hair styling iron B thus assembled, each of the first lever 26 and the second lever 27 is formed into an integral unit. As the shaft portion 37 of each of the half bodies 26b and 27b is in slidable contact with the inner surface of the bearing portion 36, the first and the second levers are pivotal relative to each other about the pivot axis S. Therefore, the plate portions 8 are brought into abutment against each other by pinching the both finger resting portions 31 together with the thumb and the index finger while holding the hair styling iron on the grip portions 4 (see phantom lines in Fig. 8b). With the switch SW put on beforehand, the temperature of the heaters H has been elevated. Thus, press treatment can be carried out, in which the hair is sandwiched and then pressed between the plates 8 while heating it at an appropriate temperature. As the plates 8 are biased away from each other by the biasing force that the torsion coil spring 38c generates, reduction of gripping force first causes reduction of the pressure and then results in the

plate portions 8 going apart from each other. This motion ceases when the inner walls 42a of the rear portions 42 abut against each other.

Also with the hair styling iron B, a strainer operation can be carried out in the same matter as with the aforementioned hair styling iron A. In addition, as it is made compact, the hair styling iron B is easy to handle with one hand. Therefore, it allows a relatively easy press treatment even on a confined region of short hair such as over the nape or around the ears by placing the strand of hair sliced with, for example, the left hand between the plates 8, and appropriately adjusting the force applied to the finger resting portions 31 with the thumb and the index finger while holding the grip portions 4. In such a case, easy operation is allowed as heat conduction to the finger resting portions 31 is hindered by the slit 32 defined between the finger resting portions 31 and the plate portions 6.

In this embodiment, as the first lever 26 and the second lever 27 are given the same shape, there is provided an advantage of lowering the costs of production and maintenance of the metal mold required. However, it is also allowed to adopt other configurations. In the previous embodiment, as the fulcrum portion 5 of the first lever 26 and that of the second lever are combined in nesting fashion, a neat outlook is provided, with the shaft ends or the like being concealed once assembled. However, it is also allowed that the fulcrum portions are simply crossed against each other and connected with a pivot pin, in the same manner as usual scissors. Moreover, it is also allowed that the spring shaft 38 is eliminated and the plate portions are opened with fingers.

What is claimed is:

1. A hair styling iron comprising:
 - (A) a first lever including a grip portion, a plate portion equipped with an electric heater, and a fulcrum portion, and
 - (B) a second lever including another grip portion opposed to said grip portion of said first lever, a plate portion equipped with an electric heater and opposed to said plate portion of said first lever, and a fulcrum portion pivotally supported by said fulcrum portion of said first lever.
2. The hair styling iron of claim 1 wherein a spring is interposed between said first lever and said second lever, said spring biasing said plate portions in the direction away from each other.
3. The hair styling iron of claim 1 wherein said plate portion of said first lever and/or said second lever have ridges along the perimeter thereof.
4. The hair styling iron of claim 1 wherein said plate portion of said first lever and/or said second lever have been subjected to a flocking treatment from the perimeter to the outer surface thereof.
5. The hair styling iron of claim 1 wherein each of said fulcrum portions of said first lever and said second lever are located between the respective grip and plate portions.
6. The hair styling iron of claim 5 wherein said first lever is provided in two separate parts divided by a median plane along the both sides, which then are assembled and integrally connected after pivotally sandwiching said fulcrum portion of said second lever between the bilateral halves of said fulcrum portion of said first lever.
7. The hair styling iron of claim 1 wherein a plot lamp is provided which blinks at predetermined intervals while said electric heater is energized.
8. The hair styling iron of claim 1 wherein said fulcrum portions

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of said first and second levers are located at the rear end of said respective grip portions, and a finger resting portion is provided on the outer side of each of said plate portions, with an intervening space for heat insulation being positioned therebetween.

9. The hair styling iron of claim 8 wherein said finger resting portion is a board-like or bar-like element that is continuous, at the forward region thereof, to the surface of said plate portion and, at the rearward region thereof, to said grip portion.

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FIG. 2

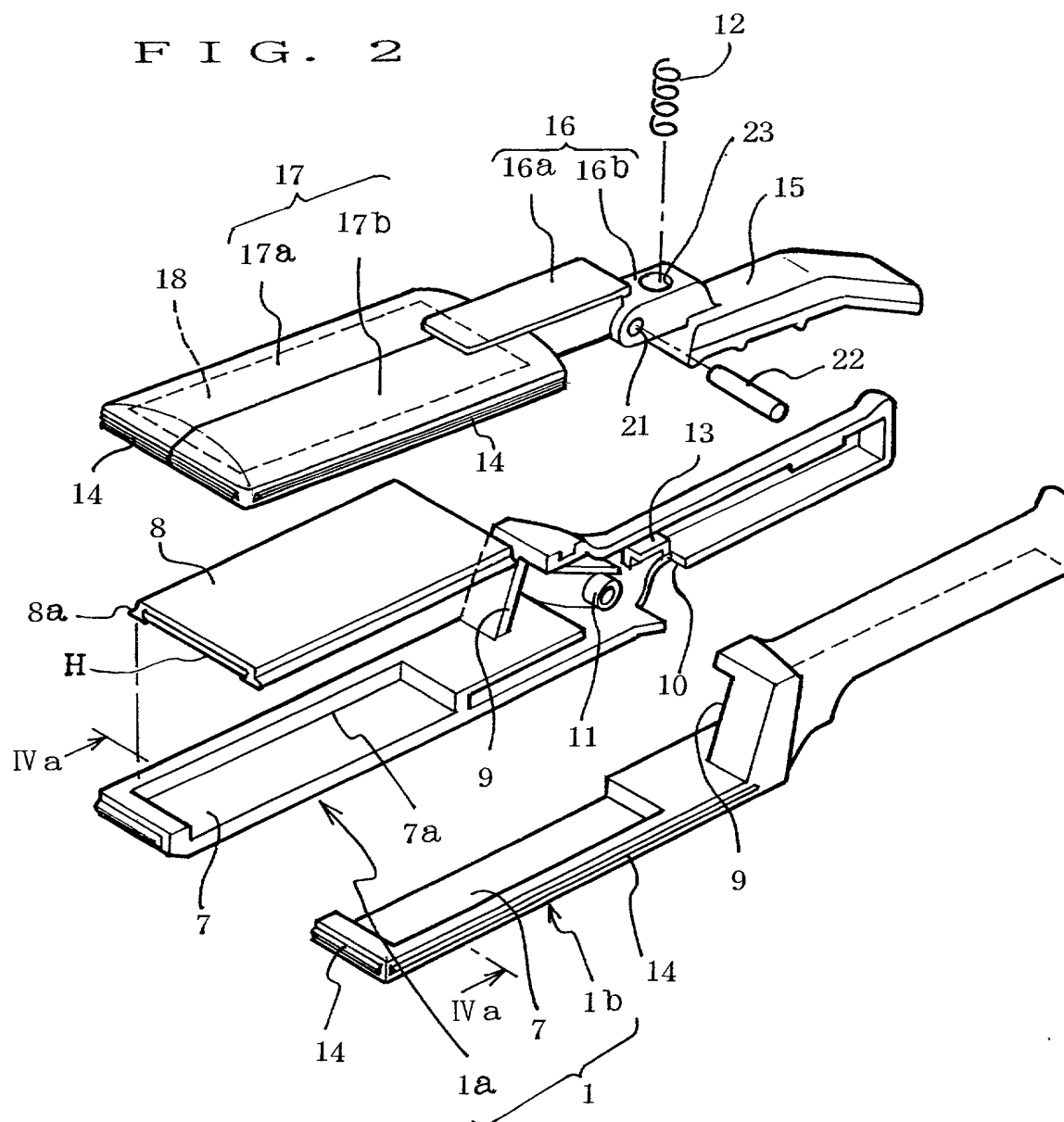
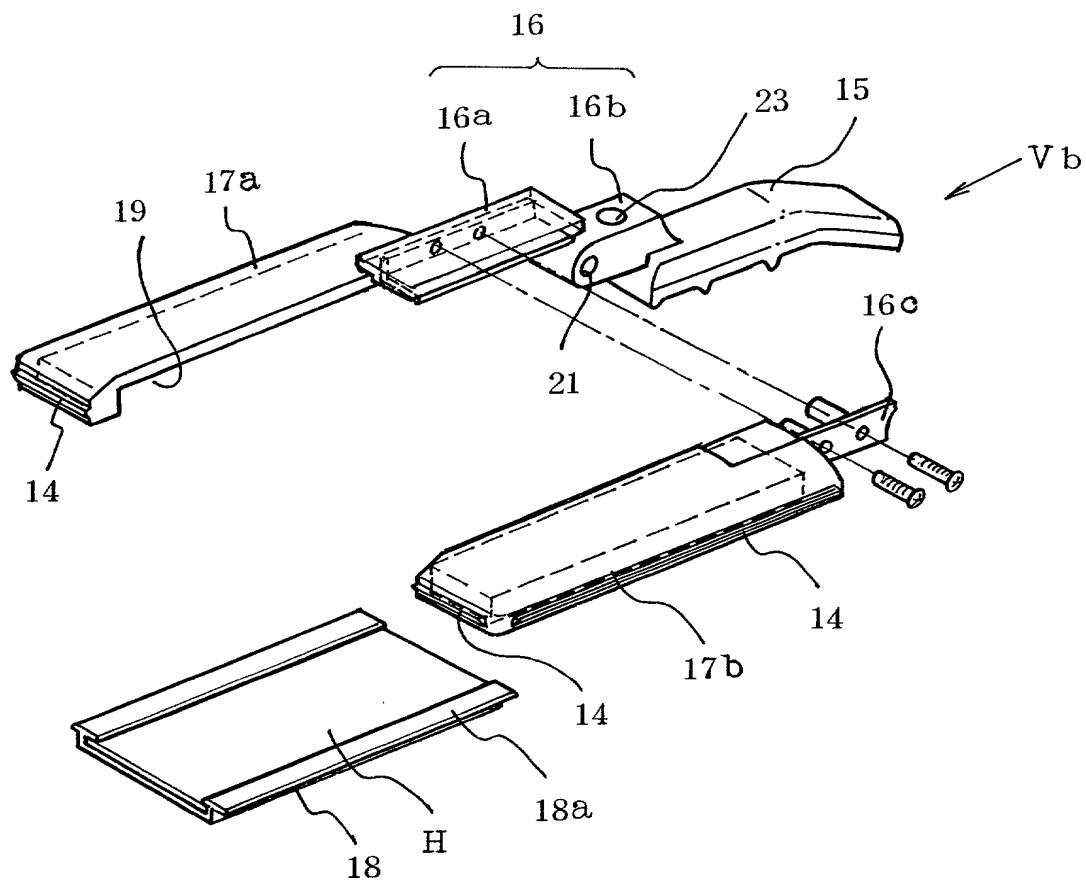


FIG. 3



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FIG. 4a

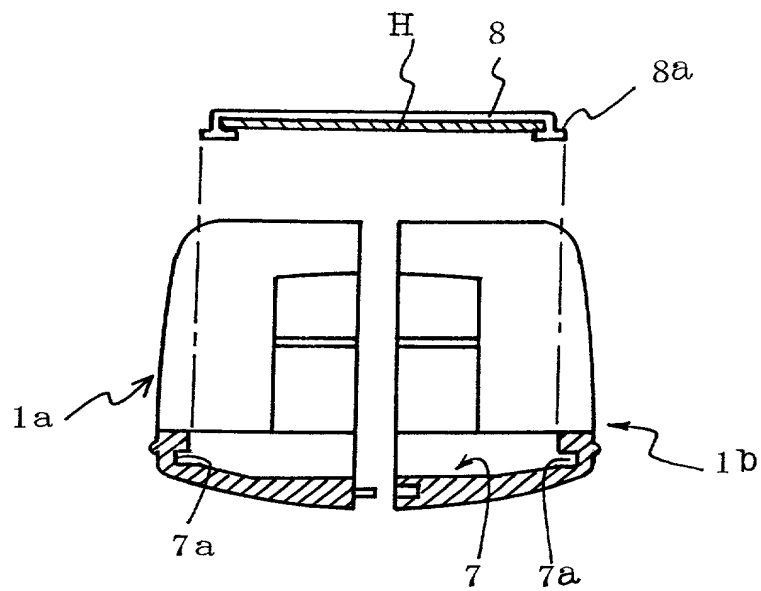


FIG. 4b

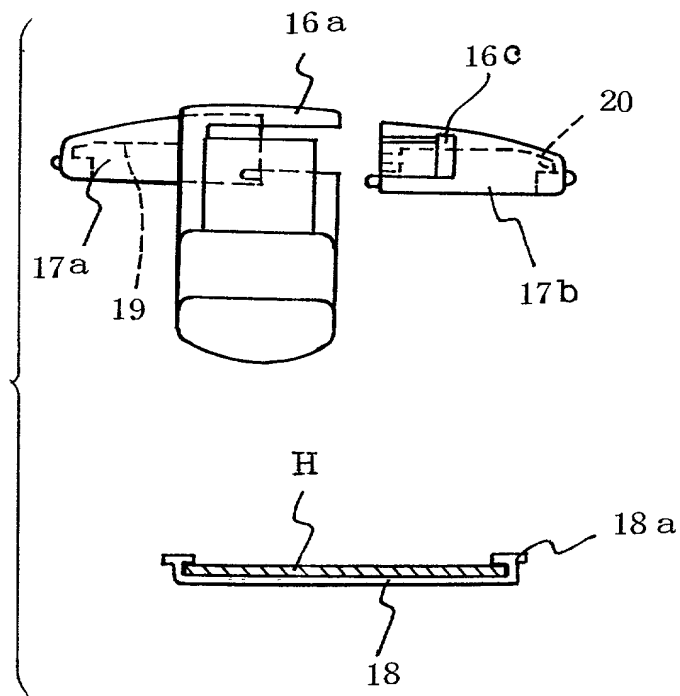


FIG. 5a

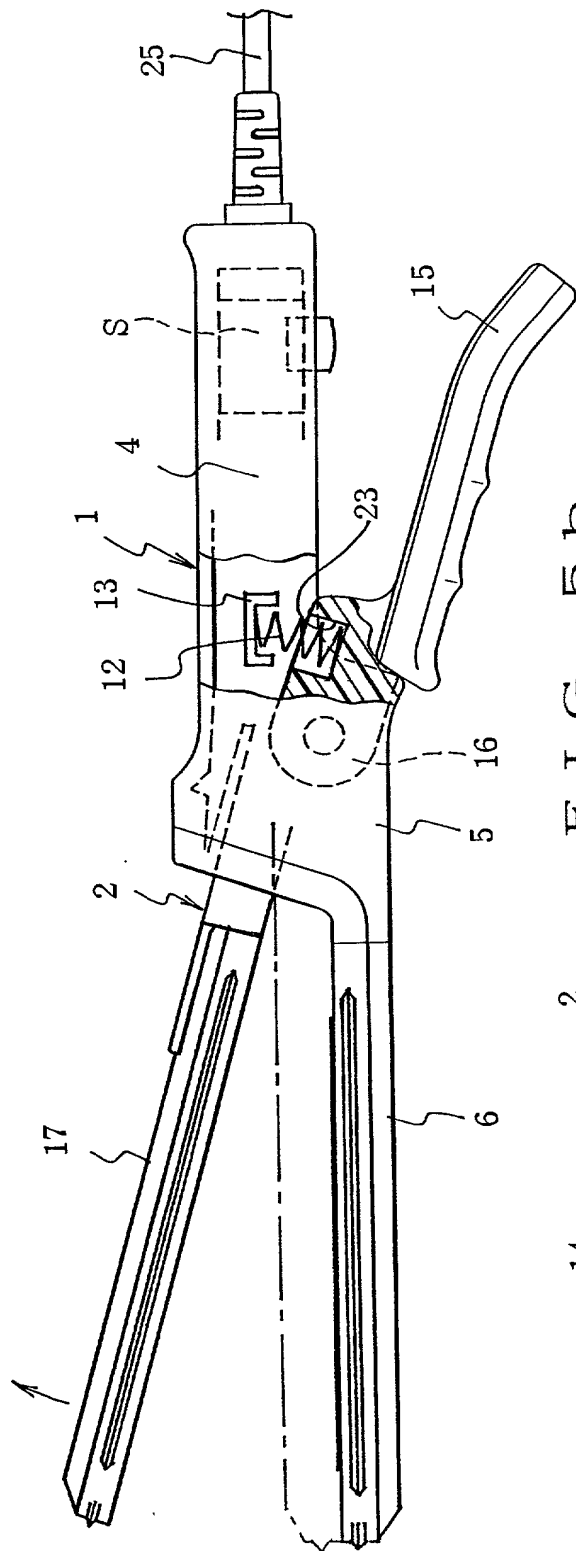


FIG. 5b

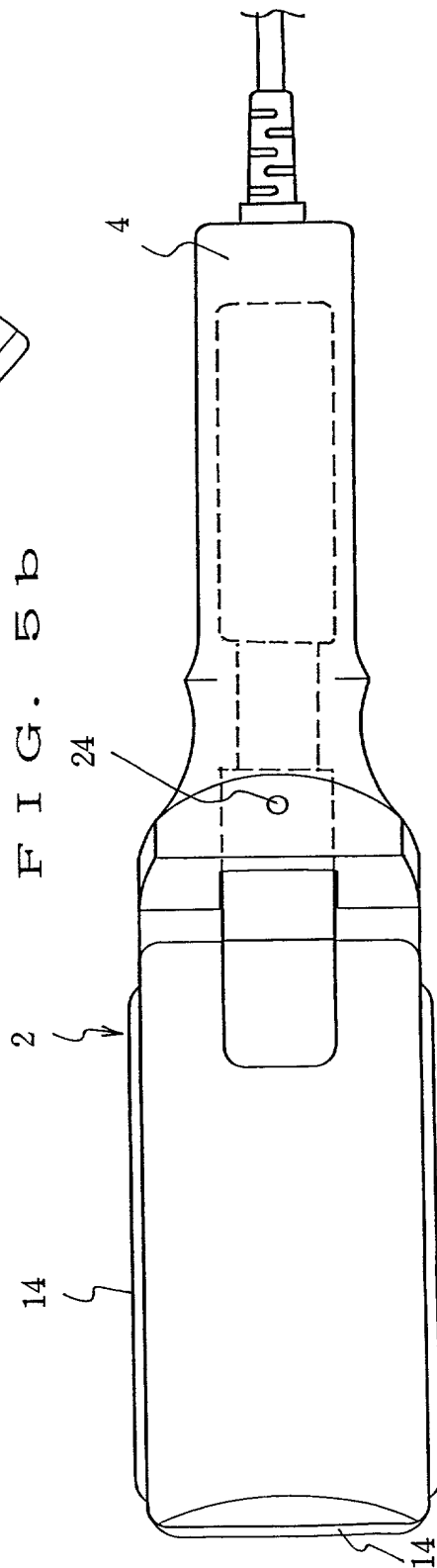


FIG. 6

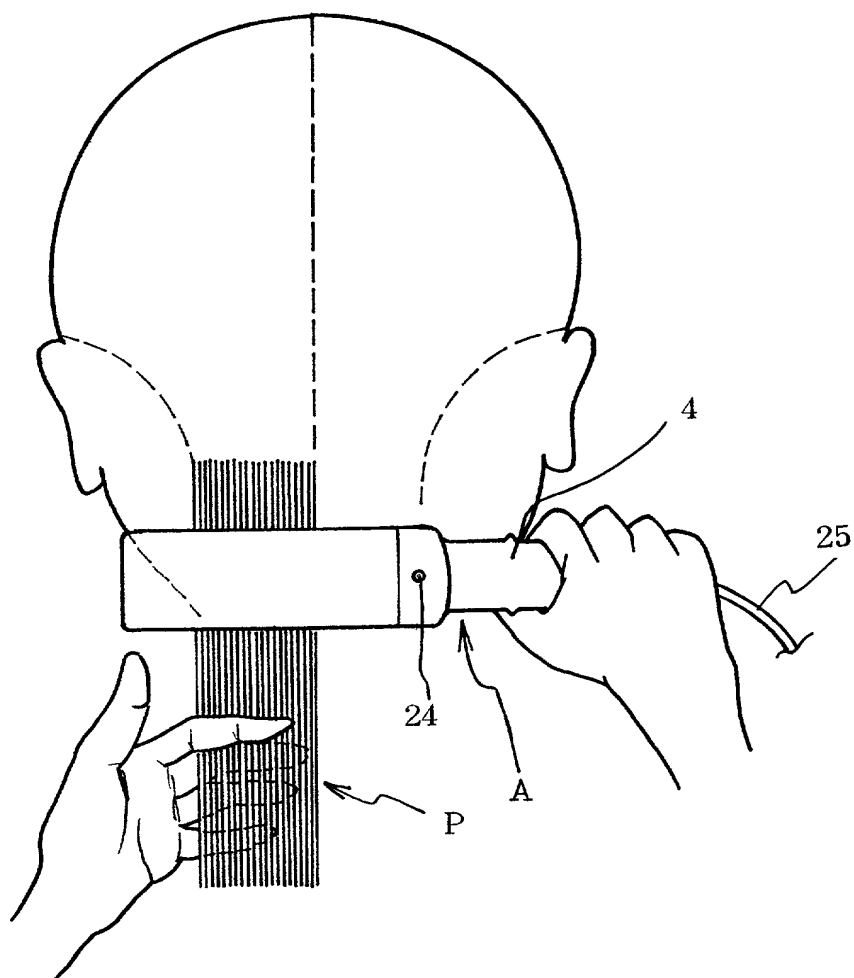


FIG. 7

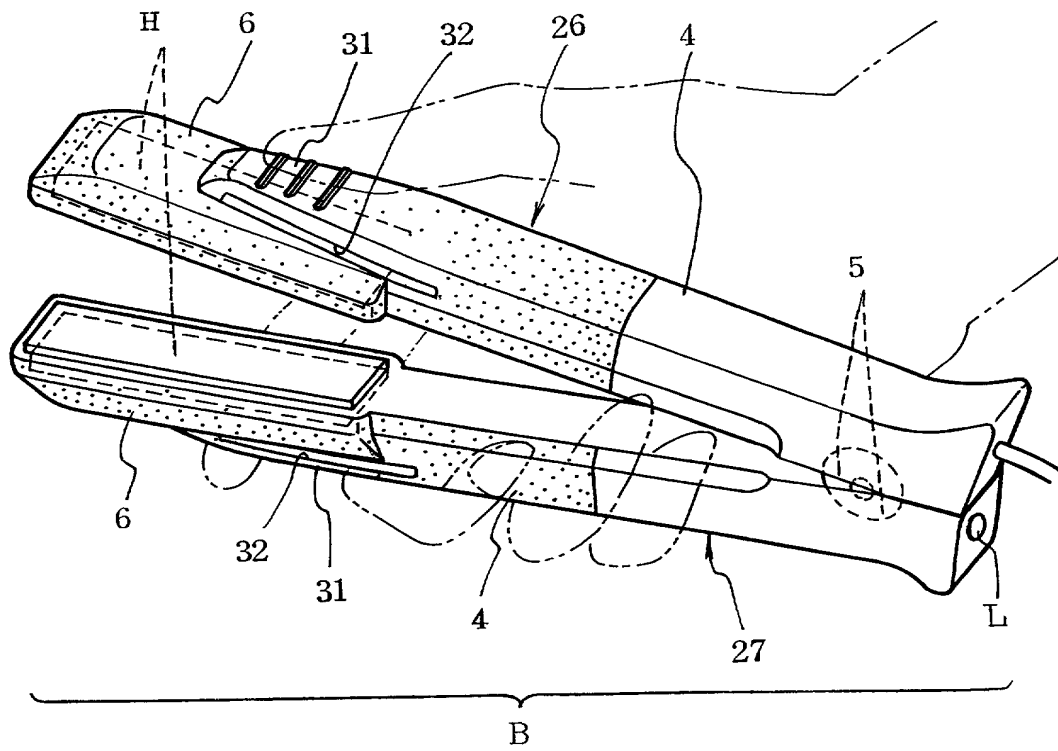


FIG. 8a

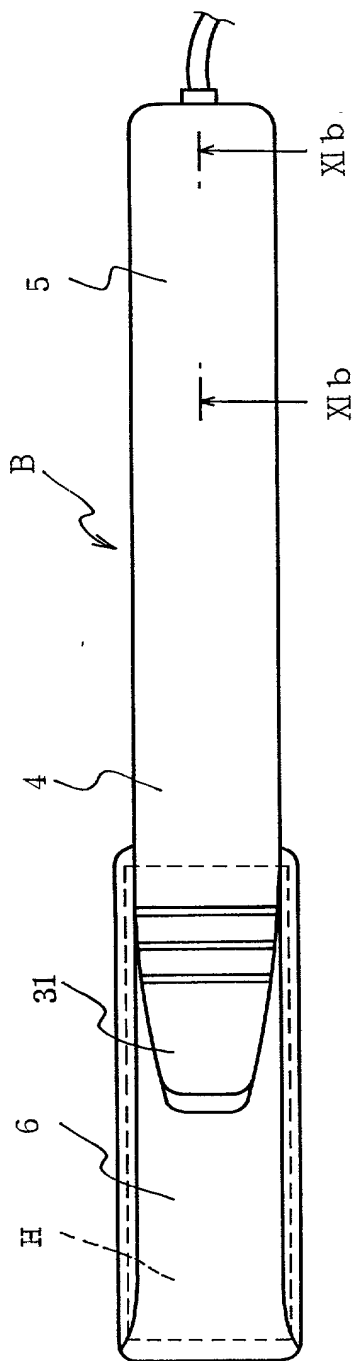


FIG. 8b

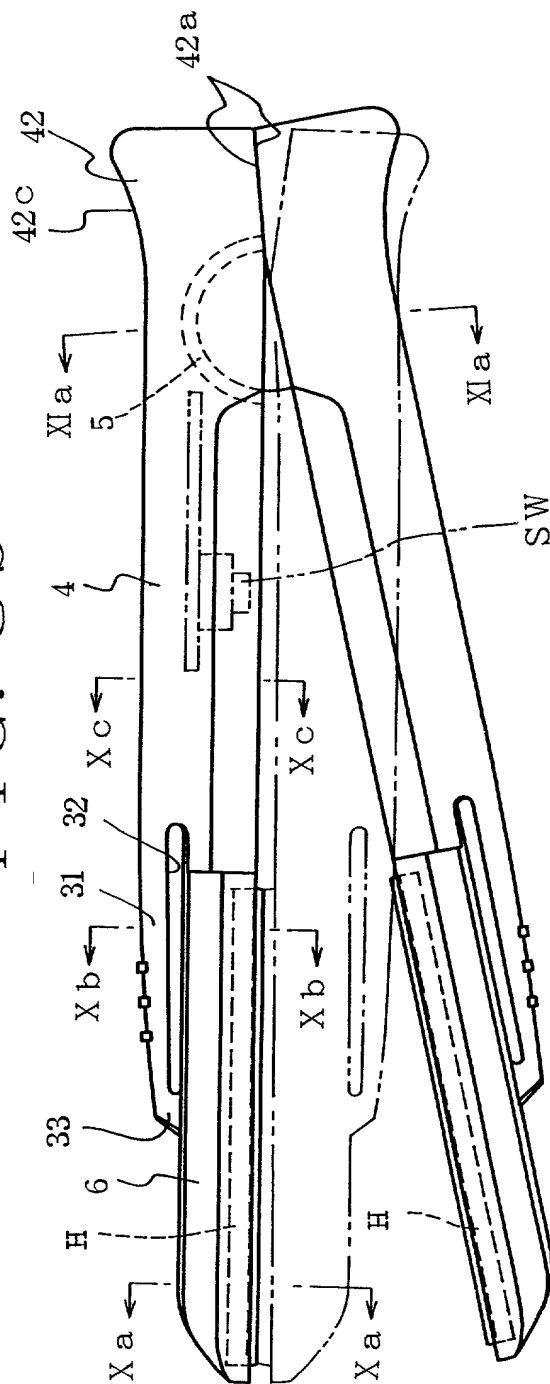


FIG. 10a

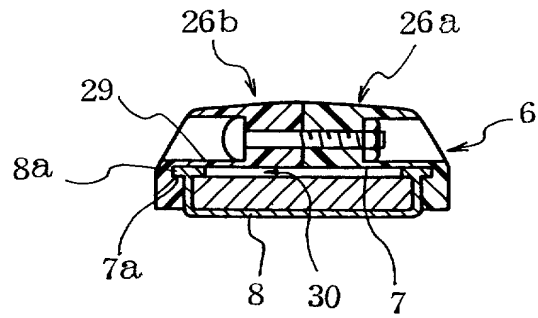


FIG. 10b

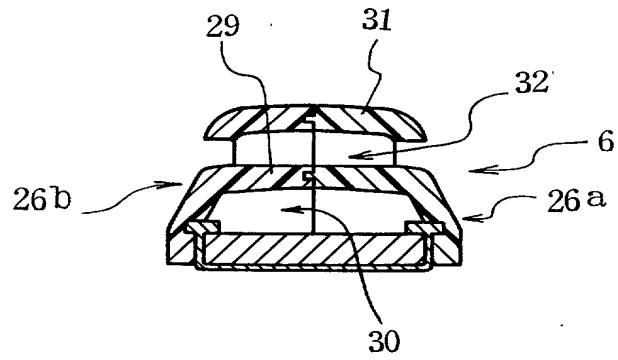


FIG. 10c

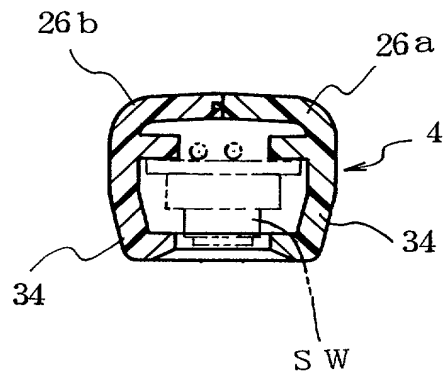


FIG. 11a

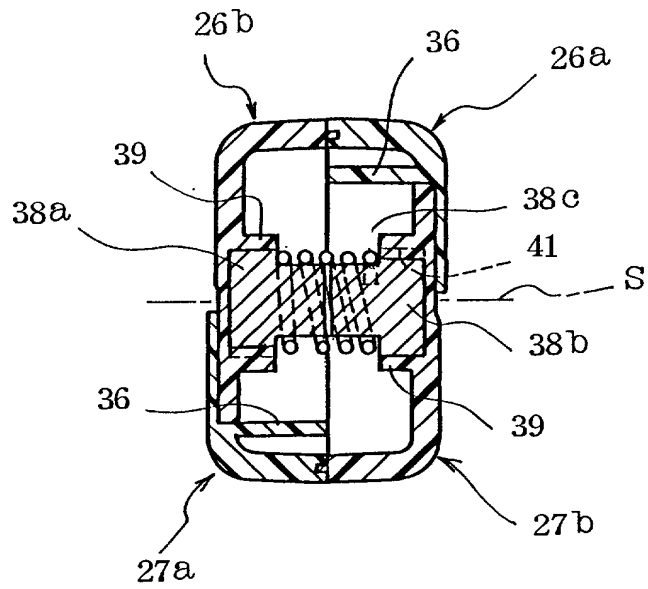
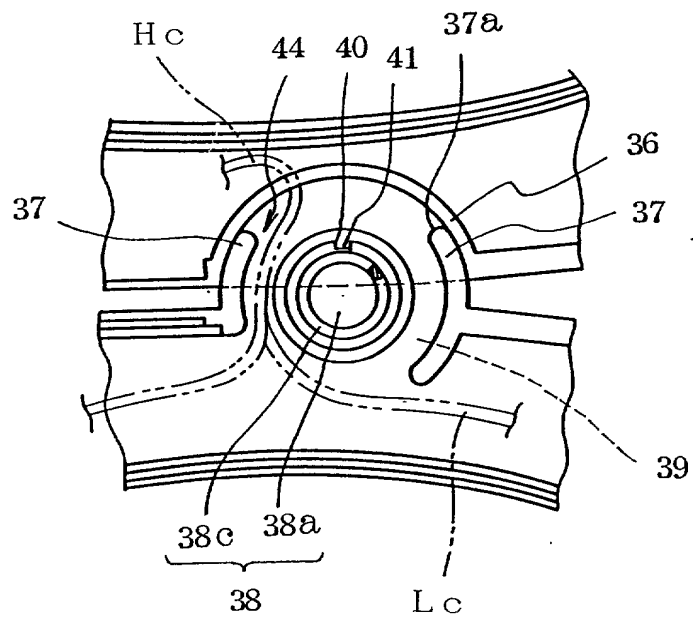


FIG. 11b



Combined Declaration for Patent Application and Power of Attorney

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and that I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

HAIR STYLING IRON

the specification of which (check one)

- ☒ is attached hereto;
☐ was filed in the United States under 35 U.S.C. §111 on _____, as
 USSN _____*; or
☐ was/will be filed in the U.S. under 35 U.S.C. §371 by entry into the U.S. national stage of
 an international (PCT) application, PCT/ _____; filed _____,
 entry requested on _____*; national stage application received
 USSN _____*; §371/§102(e) date _____* (*if known),

and was amended on _____ (if applicable).

(include dates of amendments under PCT Art. 19 and 34 if PCT)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above; and I acknowledge the duty to disclose to the Patent and Trademark Office (PTO) all information known by me to be material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §§ 119, 365 of any prior foreign application(s) for patent or inventor's certificate, or prior PCT application(s) designating a country other than the U.S., listed below with the "Yes" box checked and have also identified below any such application having a filing date before that of the application on which priority is claimed:

<u>182800/98</u>	<u>Japan</u>	<u>29 June 1998</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day Month Year Filed)	YES	NO
<u>036564/99</u>	<u>Japan</u>	<u>15 February 1999</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day Month Year Filed)	YES	NO

I hereby claim the benefit under 35 U.S.C. § 120 of any prior U.S. non-provisional Application(s) or prior PCT Application(s) designating the U.S. listed below, or under § 119(e) of any prior U.S. provisional applications listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in such U.S. or PCT application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose to the PTO all information as defined in 37 C.F.R. §1.56(a) which occurred between the filing date of the prior application and the national filing date of this application:

_____ (Application Serial No.)	_____ (Day Month Year Filed)	_____ (Status: patented, pending, abandoned)
_____ (Application Serial No.)	_____ (Day Month Year Filed)	_____ (Status: patented, pending, abandoned)
_____ (Application Serial No.)	_____ (Day Month Year Filed)	_____ (Status: patented, pending, abandoned)

I hereby appoint the following attorneys, with full power of substitution, association, and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

SHERIDAN NEIMARK, REG. NO. 20,520 - ROGER L. BROWDY, REG. NO. 25,618 - ANNE M. KORNBAU, REG. NO. 25,884
 NORMAN J. LATKER, REG. NO. 19,963 - IVER P. COOPER, REG. NO. 28,005 - ALLEN C. YUN, REG. NO. 37,971*
 NICK S. BROMER, REG. NO. 33,478 - * Patent Agent

ADDRESS ALL CORRESPONDENCE TO
BROWDY AND NEIMARK, P.L.L.C.
 419 Seventh Street, N.W.
 Washington, D.C. 20004

DIRECT ALL TELEPHONE CALLS TO:
BROWDY AND NEIMARK
 (202) 628-5197

The undersigned hereby authorizes the U.S. Attorneys or Agents named herein to accept and follow instructions from AKIYAMA AND CO. as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. Attorney or Agent and the undersigned. In the event of a change of the persons from whom instructions may be taken, the U.S. Attorneys or Agents named herein will be so notified by the undersigned.

